

Improving high school students' basic skills to analyze nutrition value labels of food products

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Abstract

The nutrition label is important for commercial food products to be available in the market and is compulsory to be included in the package. This paper's objective is to present the training description and its effectiveness in improving students' knowledge regarding creating nutrition labels for food products based on BPOM regulation. An experimental with Community Based Research approach was used in this study. A total of 26 female students from Senior High School (SHS) 1 Karas were involved in a one-day training. Based on the observation, most students were fairly participated during the training (33.4%). There was a significant increase in the respondents' knowledge after vs. before the training (45.77 vs. 32.69, p -value<0.05). We found a trend that students who performed low participation tended to have a lower post-test score. The student's participation during the training seems to correlate positively with the post-test score. We confirmed this relationship with Spearman rho's test, in which the correlation was 0.85 (p -value<0.05), suggesting that the correlation was strong enough. Our study demonstrated that one training session had a significant impact on the first-grade SHS students' knowledge of analyzing the nutrition value label on the food product. Engaging students to participate in the class actively can enhance the student's understanding. More intensive training with innovative methods that facilitate shy students.

Keywords: food product; nutrition value label; food label; training; commercial food products

Abstrak

Label Informasi Nilai Gizi (ING) penting untuk dicantumkan dalam produk pangan kemasan komersial agar dapat dijual di pasaran. Penelitian ini bertujuan untuk memaparkan gambaran pelatihan dan efektivitasnya dalam meningkatkan pengetahuan siswa mengenai cara pembuatan label ING produk pangan berdasarkan peraturan BPOM. Penelitian ini menggunakan metode eksperimental dengan pendekatan Community Based Research. Sebanyak 26 siswi SMA Negeri 1 Karas dilibatkan dalam pelatihan yang berlangsung selama satu hari. Berdasarkan observasi, sebagian besar siswa memiliki tingkat partisipasi yang cukup selama pelatihan (33,4%). Terdapat peningkatan signifikan pada pengetahuan responden setelah dan sebelum pelatihan (45.77 vs. 32.69, nilai- p <0.05). Terdapat tren bahwa siswa dengan tingkat partisipasi rendah cenderung memiliki nilai posttest yang lebih rendah. Uji Spearman rho menunjukkan adanya korelasi positif antara tingkat partisipasi dan nilai posttest responden ($r=0,85$, nilai- p <0,05). Penelitian kami menunjukkan bahwa pemberian pelatihan sehari dapat memberikan dampak yang signifikan terhadap pengetahuan siswa kelas satu SMA dalam menganalisis label ING pada produk makanan. Saran bagi penelitian selanjutnya adalah untuk dapat

mengakomodir pelatihan yang lebih intensif dengan metode inovatif yang memfasilitasi tingkat partisipasi responden.

Kata Kunci: produk pangan; Informasi Nilai Gizi; label pangan; pelatihan; produk pangan kemasan

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1. Introduction

Nowadays, the rapid development of global industry resulted in the demand for more skillful human resources in the labor market (Fitriyanti et al., 2021). According to the previous Indonesian national statistical data (BPS), the rate of unemployment in Indonesia was mostly contributed by Secondary High School (SHS) graduates, accounting for 9.94% (Puspajuita, 2017). The amount of unemployment in Indonesia, especially among educated people, remains increasing over the years. It was estimated that the unemployment contributed by SHS graduates increases by 3.2% per year (Lyu et al., 2019).

To overcome the higher rate of unemployment among SHS graduates in Indonesia, the East Java Provincial government launched a "Double Track" program in 2018. This program provides the SHS students with entrepreneurial knowledge and skills through actual practice, supervised by experts in particular fields. The Double Track program is offered in an extracurricular class, providing various specific skill areas that can be chosen by the students. The areas of extracurricular programs are including 1) multimedia (animation, graphic design, photography, video editing, computer operators), 2) electrical engineering (computer network installation and electrical installation), 3) catering (pastry bakery process and Indonesian food making), 4) fashion design, 5) beauty management, and 6) light vehicle engineering (Puspajuita, 2017; Yulikah et al., 2021).

In 2019, there were 157 Secondary High Schools in East Java province that participated in the Double Track program. Among them, SHS 1 Karas in Magetan was chosen by the government to participate. In SHS 1 Karas, catering program was offered as the extracurricular integrated with the Double Track program. The catering program has been established for 2 years and the students have already produced several food products that are ready to enter commercial market for sale. However, currently the product sales are still limited due to the absence of food nutrition labels in it. The students have no knowledge to make nutrition labels in their food products. Therefore, a training program is needed to 1) provide the students with basic knowledge about nutrition label in food product and 2) how to create standard nutrition label in food product according to Indonesian National Agency of Drug and Food Control (*BPOM*) regulation. By knowing how to create nutrition food

label, the targeted students can implement the procedure into their food product and they can expand the market sales.

2. Methods

This present study was based on Community-Based Research (CBR) approach. The training which was the intervention given in this study is aimed to change or improve the knowledge of the targeted students. The involvement of the community within this study, as the main characteristics of CBR (Krishnan et al., 2017), was reflected from participatory of the targeted school on the formulation of the objective and the delivery method of the training.

2.1. School profile and rationale of training program

The trainees were students of SHS 1 Karas Magetan who joined the catering extracurricular program. SHS 1 Karas is located Temenggungan Village, Karas Regency (rural area) in Magetan, East Java Province and established in 1998. The SHS 1 Karas is one of the most favorite public schools in Magetan. In 2021, SHS 1 Karas won the Best Poster category for Student Business Product in East Java Provincial Millennial Entrepreneur Award. Moreover, SHS 1 Karas Magetan is one among the other schools in East Java Province appointed to carry out Double Track program.

The implementation of Double Track program in SHS 1 Karas including the provision of extracurricular programs in specific areas. The areas offered were catering, fashion, photography, and light vehicle engineering. In the catering extracurricular program, SHS 1 Karas students have successfully sold food products they made and generated incomes. Chips, cake, and bakery were the examples of the food products that they created through the catering extracurricular program. The market for the food product was still limited and did not reach a wide market due to the absence of food label.

According to Indonesian National Agency of Drug and Food Control (BPOM) regulation No 16 of 2019, all processed food is required to include information of nutritional value label on its package. This regulation is excepted for powder tea and coffee, tea bag, mineral bottled water, herbs, spices, seasoning, alcoholic beverages, and condiments products. The label is part of a product that carries verbal information about the product or the seller. Nutritional Value Information is the information that can provide guidance for potential consumers regarding the nutritional value and the food ingredients content. In Micro, Small and Medium Enterprises (MSMEs), the nutrition value label can be made based on the BPOM Regulation Number 16 of 2019. The nutrition label can help consumers determining whether or not to consume these food or beverage products, not only based on preferences but also due to the health conditions. The regulation mentions that the information of Nutritional Value must be written in a tabular form and contains information regarding the following 1) Serving size; 2) Number of servings per package; 3) Type and amount of nutrient content; 4) Type and amount of non-nutritional substance content; 5) Percentage of Adequacy of Nutrition (RDA); and 6) footnotes.

2.2. The overview of training program

This program was initiated by the collaboration between SHS 1 Karas Magetan and Department of Nutrition, Universitas Negeri Surabaya. SHS 1 Karas Magetan requested an expert assistant to provide their students with understanding in how to create nutrition label that would be applied to the food product they made ready for commercial sale. On the other hand, this program enabled the Program Study of Nutrition Universitas Negeri Surabaya to actualize the community service as part of *Tri Dharma* agenda. Tri Dharma (or three 'Dharma') is known as three pillars of higher education in Indonesia, consisted of 1) research, 2) education, and 3) community service. In general, the program consisted of three steps including preparation, implementation, and evaluation.

2.2.1. Program preparation

The program preparation involved activities prior to the training implementation, mainly consisting of 1) instruments and educational media development and 2) communication with the host regarding the implementation plan of the program. These preparation activities were carried out to ensure that the training would meet the host's needs. There were four lecturers in Program Study of Nutrition who engaged in the program and one of them was appointed to be the project leader. The main responsibilities of the project leader were to ensure that the program comply with the plan and to coordinate with the SHS 1 Karas regarding the program implementation.

The training was designed as a classroom lecture followed by a discussion at the end of the session. The lecture technique was chosen due to its advantages, which can accommodate a wide range of audience, take less time to design, give more assurance for the trainees to complete the training (Martin et al., 2014). Furthermore, it is suggested that the lecture method can effectively improve trainees' knowledge in health promotion program (Sumitro et al., 2019). Despite its various advantages, there are several limitations in the lecture technique that we were aware of. The lecture method is passive and lacking in interaction since it depends on a one-way communication (Martin et al., 2014). To overcome those limitations, we designed several activities during the training, which consisted of icebreaking, several basic questions to be solved together by the audience, and a discussion session. At the end of training, we provided several gifts or rewards for the students who actively answer or ask in the training.

Prior to the implementation of the program, we developed learning materials (a module and a PowerPoint) and instruments to evaluate the effectiveness of the training. The module consisted of 53 pages in total (17 pages for the main content and 36 pages for appendix that represents Indonesian National Agency of Drug and Food Control (*BPOM*) regulation No 16 of 2019), printed on A5 size papers. In addition, PowerPoint, consisted of 19 slides was developed. Both the materials contents were established from literature study, brain storming, and discussion among the team members.

(a)

MODUL PEMBUATAN MEDIA INFORMASI GIZI
PADA PRODUK PANGAN BAGI SISWA
SMAN 1 KARAS MAGETAN



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Daftar Isi

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Daftar Isi	ii
1. Deskripsi Singkat	1
2. Tujuan Pembelajaran	1
3. Pokok Bahasan dan Sub Pokok Bahasan	1
4. Bahan Pembelajaran	1
5. Urutan Materi	2
Kunci Jawaban Latihan Soal	16
Daftar Pustaka	17
Lampiran 1	18

(b)

Fig. 1. An illustration of (a) module and (b) PPT slides used as learning materials.

To evaluate the effectiveness of training, these three various methods can be used, namely observation, questionnaire, and interview (Kunche et al., 2011). In this present training, we designed to use two methods, particularly observation and questionnaire. We did not incorporate any interview in the evaluation since it demands more time to carry out. Moreover, by using observation and questionnaire methods, we could collect both quantitative and qualitative data and thus the use of the two methods is sufficient. These two methods require different instruments to be developed. The observation method needs a record form regarding the students' participation or behavior during the training while the questionnaire requires some questions in the form of multiple choices that would be given before (pre-) and after (post-) the

training. The questions in pre- and post- training questionnaires were similar and consisted of 10 multiple choice questions. The questionnaire was made according to objectives of the training. Each number of the question that was answered correctly would be given a score of 10 while incorrect answers scored 0. The indicators of student participation and behavior during the training that were observed including 1) paying attention to explanations, 2) discussing with friends, 3) answering questions, 4) expressing opinions during the discussion session, and 5) doing assignments. Based on 'yes' or 'no' the activities above were performed, the students' participation was categorized as 1) 'very good' if 4 of 5 criteria were performed, 2) 'good' if 3 criteria were performed, 3) 'medium' if 2 criteria were performed, and 4) 'poor' if 1 or none of the criteria was performed.

While the training materials were provided by the Program Study of Nutrition Universitas Negeri Surabaya, facilities and trainees provisions were assigned to SHS 1 Karas. The facilities needed to be prepared were LCD projector, a classroom, LCD screen, microphone, and sound speaker.

2.2.2. Program implementation

The program was a one-day offline training and conducted on July 28th, 2022. The participants of were 26 students (all female, 1st grade) of SHS1 Karas who joined the Catering extracurricular program. The students who became the training participants were appointed by the school teacher. The duration of the training was approximately three hours. A trainer who already had a prior knowledge regarding the regulation of food product's nutrition label gave a training to the students whereas the other three people of the team conducted as observers. The primary role of the observers was to observe and record students' activity throughout the training implementation.

Before the training started, the trainees were asked to fill out the pre-test questionnaire within 10 minutes. The questionnaires were printed, and the trainees were requested to answer all questions by themselves. After collecting all answered questionnaires from the trainees completely, then the training was started by distributing of commercial food products into the trainees. The food products that displayed included snack bar, milk, chocolate bar, cereal bar, and chip. In a peer group of two or three students, the trainees were asked by the trainer to recognize any components in particular nutrition label that printed in the package of food product they receive. Generally, the nutrition label is located in the behind of the food package. Then, the trainer informed the objective of the training followed by the content explanation. The content of the training included these consecutive stages:

1. Learning about the elements of nutrition label in the food product;
2. Understand Indonesian Dietary Recommendation;
3. Understand how to make a simple calculation to create nutrition label based on given cases;
4. Identify the content of each ingredient of the product; and
5. Calculating product calories based on the product's weight and serving size.



Fig. 2. Training implementation that carried out in a classroom

2.2.3. Program evaluation

Training evaluation can be defined as a process to collect data on the effects of training programs. Evaluation is a planned and systematic method that collects the information about what extent the training improves the performance of those who have undertaken training. It can be used to assess the effectiveness and to provide the form of quality assurance in the training program (Dahiya & Jha, 2011). The program evaluation is often divided into two types, which are formative and summative evaluation. Formative evaluation is aimed to identify the weakness in material, method, or learning objectives in order to provide information for program improvement and quality assurance. On the other hand, summative evaluation focus on the determination whether the intended training objectives and outcomes are met (Wang & Wilcox, 2006).

With regard to this present training, we only intended to perform a summative evaluation. According to the summative approach, the training evaluation can be made through knowledge enhancement assessment as well as by measuring trainees' reaction while the training is occurring. The trainees' reaction is assumed to be a perceptual evaluation whether they are clear about their learning process (Wang & Wilcox, 2006).

The objectives of the present training were to 1) provide the students with basic knowledge about nutrition label in food product and 2) how to create standard nutrition label in food product according to Indonesian National Agency of Drug and Food Control (*BPOM*) regulation. These objectives were formulated according to the request of SHS 1 Karas representative. Previously, the students of SHS 1 Karas had no prior knowledge related to food products' nutrition label. Furthermore, to widen the market of the food produced through the school catering extracurricular program, they need to know how to create the nutrition label according to the national regulation.

3. Result and Discussion

Based on the observation, mostly the students performed 'fair' participation during the training (33.4%). As many as 29.6% of the students showed 'good' participation. Moreover, 18.5% of students had 'poor' participation. Of the rest, only 15.8% achieved 'very good' participation (see Fig. 3). Although the trainer already tried to enhance the students' participation during the classroom activity by giving rewards to those who were brave to speak up, most of the students remained too shy. The shyness among the trainees perhaps due to the condition which all of them were female and very young. It is known that gender and age of people have an association with shyness and hesitation feelings, affecting reluctance to express the opinion verbally. Female and youth are the group where the shyness/ hesitation is more prevalent than the others, especially among Asian people (Onukwufor & Iruloh, 2017; Yadav et al., 2020).

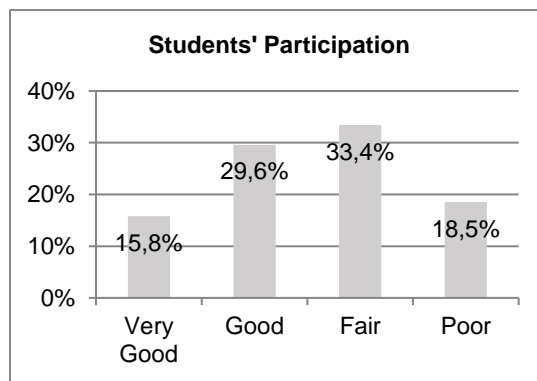


Fig. 3. Students' Participation during the training activity based on the researchers' observations

We also assessed the students' performance in answering pre- and post-training questionnaires. The scores were compared using paired *t-test* to investigate whether there was a significant difference in mean score before and after the training. Based on the paired *t-test*, we found that there was a significant difference between pre- and post-knowledge score (p -value < 0.05). Before the training, the students' knowledge mean score was 32.69 and increased at 45.77 after given a training (see fig. 4).

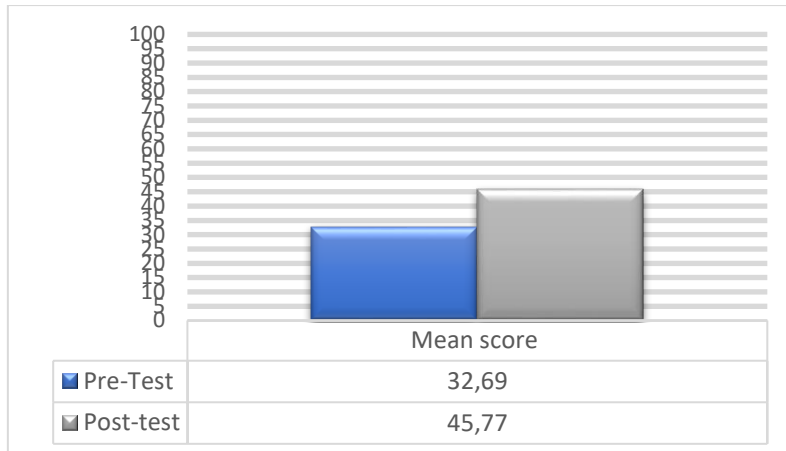


Fig. 4. Students' Knowledge Mean Score based on Pre- and Post-Training

Our results show that the training can effectively improve students' knowledge regarding how to create a nutrition label for food products, although the increase was relatively small (13 points). This result was relevant since the training objectives were to assist the students to understand and identify nutrition label of food products, as well as to calculate nutrient content from the label. These three operational training objectives are considered basic skills in order to create nutrition labels of food products. The objective term of 'identify' and 'calculate' represent operational dimension for analyzing skill in Bloom's Taxonomy. Moreover, 'Analyzing' skill is categorized as higher-order thinking (HOT) skill (Arafah et al., 2021). A single three hours training course perhaps might not adequately prepare the students to achieve the intended objectives. Also, rather than implementing lecture-based training, which is more focusing on Teacher Based Learning, Student Centered Learning (SCL) approach is likely to be more effective to achieve the HOT training objectives. The SCL approach in learning model that is appropriate to be conducted in this training is problem-based learning (PBL). Some literatures suggested that PBL model can enhance student critical thinking (Istadi et al., 2022; Richland & Simms, 2015).

Next, we analyzed the correlation between students' participation activity during the training with the post-test score in the knowledge aspect. We found a trend that students who participate less tended to have a lower post-test score (see table 1). This finding suggested that the students' participation activity during the training has a positive correlation with the post-test score in the knowledge domain. Then, we conducted a Spearman rho's test to examine whether the correlation between students' participation and post test score has a statistic significancy. Our result showed that the correlation coefficient between them was 0.85 (p -value < 0.05), suggesting that the correlation was highly strong. Our result was in line with the results of Widiyanto's study (2015) which shows that student activity during the learning process plays an important role in learning and can improve learning achievement.

Table 1. Crosstabulation between Students' Participation and Knowledge Score After Training

Participation	Posttest Score in Knowledge		
	High	Moderate	Low
High	6 (23%)	0	0
Moderate	5 (19%)	5 (19%)	0
Low	0	3 (12%)	7 (27%)

Students' participation in educational or learning activities can influence the process of thinking development and thus may have effects on learning outcome (Mohammed Saad Al Yahya, Norsiah Mat and Alharbi Mohammad Awadh, 2013). Several attempts can be made to enhance students' participation and engagement during the learning process. One of them is through discussion activities. In this present study, we already facilitate a discussion session at the end of the training. However, the shyness among the participants became a challenge to carry a two-way active discussion. It seems that communication among the students has not been well established since the participants were newly entered students (grade 1st), hence only students with active characters have an active tendency, while students with low initial abilities who are quiet tend to be listeners during the training.

4. Conclusion

This paper provides a description of a training program, starting from the program preparation, implementation, and evaluation. The training was to administer the students in the catering extracurricular class as part of Double Track program with a knowledge of nutrition label in food products. The training was conducted in a three-hours lecture in SHS1 Karas, Magetan.

Our study demonstrated that one session of training had a significant impact on the first-grade secondary high school student's knowledge to analyze the nutrition label on the food product. A higher improvement was shown among students who were more active during the learning process. Engaging students to become actively participating in the class can enhance the students' understanding. More intensive training with innovative methods that facilitate shy students to participate comfortably during the training is warranted.

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